THE THREE BRANCHES OF SOCIOMETRY: A POSTSCRIPT

Introduction

The historians of the year two thousand will probably credit sociometry as the true beginning of a meaningful and useful sociology. It was the unique contribution of sociometry to have discovered and systematically investigated the fundamental nature of the "socius" and henceforth to have laid the foundation of a dynamic science of the group.

Systematics in sociometry is an orderly collection of logically related principles and facts so arranged as to express the whole range of measurable truth in the departments of interpersonal and intergroup relations. Dimensional analysis of sociometric data is only *one* method by means of which the relationship of sociometry to systematics may be shown. Although the body of sociometric knowledge to be ascertained is ultimately one and the same, the conditions under which the true facts emerge differ widely and therefore the same phenomena can be mirrored and represented by many kinds of systems. The real test for the usefulness of dimensional analysis is in the future; it must prove that it can add to sociometric knowledge and that it is a better language for communicating sociometric findings than the already existing methods of representation.

Definition

The chief methodological task of sociometry has been the reorientation of the experimental method so that it can be applied effectively to social phenomena. Sociometry has been defined as "the mathematical study of psychological properties of populations; the experimental technique of and the results obtained by application of quantitative methods"; also as "the inquiry into the evolution and organization of groups and the position of individuals within them";[1] the "measurement of person to person, person to group and group to group relations." As the "science of group organization"[2] "it attacks the problems not from the outer structure of the group, the group surface, but from the inner structure,"[3] the group depth. The

[1]"Psychological Organization of Groups in the Community" by J. L. Moreno, Yearbook of Mental Deficiency, Boston, 1933, pp. 51.

[2]"Conference on Group Method", The National Committee on Prisons and Prison Labor, Meeting of the American Psychiatric Association, Philadelphia, 1932, pp. 15. Second edition of this conference on Group Method is contained in "Group Psychotherapy," Beacon House, 1945.

[3]"Application of the Group Method of Classification", 1932, pp. 90.

definition of sociometry was thus in accordance with its etymology, from the Latin, but the emphasis was laid not only on the second half of the term, i.e., on "metrum" meaning measure, but also on the first half of the term, i.e., on "socius" meaning companion. Both principles had been neglected but the "socius" aspect had been omitted from the deeper analysis far more than the "metrum" aspect.

Position in a System of Social Sciences

The phrase sociometry has a linguistic relatedness in construction to other, traditional scientific terms, biology, biometry; psychology, psychometry; sociology, sociometry. From the point of view of systematics it is the study of group structure preparatory to the topical fields, sociology, anthropology, social psychology, social psychiatry, etc. It is concerned with the "socius" *and* "metric" problems common to all social fields, human and subhuman. Sociometry as a science is an ideal; in its broadest outlook it engulfs but is not identical with any particular trend.

Historical Position of Sociometry

Conceptual and theoretical illuminations derived from many sources and minds, G. Simmel, J. Baldwin, C. Cooley, G. H. Mead, F. Znaniecki, W. Thomas, E. Burgess, but the decisive inspiration came in 1923 from a practical experiment in spontaneity research, in 1931 from a practical experiment in community organization, with devices which permitted simultaneous diagnosis, therapy and measurement of interpersonal and intergroup relations.

The official start in 1923[4] began when a small group of individuals were studied in interaction and the means of measuring this was invented; the socius and the metrum problems were simultaneously attacked. Both approaches were methodically synthesized into a single operation. The material phase of this operation developed later into the spontaneity, situation and sociometric tests of today. The measurement instruments, the interpersonal and movement diagram (Moreno, 1923)[4] developed later into the interaction diagram (Lowell J. Carr, 1929); the sociogram (Moreno, 1931) developed into the sociomatrix (1937). *Hot* (socius) and *cold* (metrum) sociometry were one. As I have pointed out in previous publications[5] the macrosociological has prevailed for centuries without any true

[4]With the publication of "Das Stegreiftheater" J. L. Moreno, Gustav Kiepenheuer Verlag, Berlin. See pp. 87-95, interpersonal and movement diagram. American Edition "The Theatre of Spontaneity", 1947.

[5]"Who Shall Survive?", see particularly chapter on *Social Microscopy*, 1934.

advance in the social sciences. It apparently appealed to a superficial sense to think of mankind as a sum of so and so many, approximately two billion individuals, as if it would have no social structure of its own. It appealed also to the presociometric social measurists to count the individuals and be satisfied with it and consider a mass as a sum of individuals. If we take 1923 as the conceptual and 1933 as the official origin of sociometry in literature, it took sociometry twenty-five years in order to arouse the awareness of social scientists everywhere, that there is something like a group structure which is *more* than the sum of the individuals participating in it and that this new world can be measured. This revolution in knowledge did not come from macrosociological ventures à la Comte, Marx, von Wiese or George H. Mead, but from the stubborn attention given to small social systems by methods of social microscopy. Whereas macrosociological approaches have been either sterile or to a large extent intuitive, the number of important discoveries made by sociometric studies are considerable although, to the detriment of progress of the social sciences, not fully appreciated, not even by sociometrists.

Three Branches of Sociometry

Since its conscious inception it has developed three departments of research, (a) dynamic or revolutionary sociometry—when the new sociometric order replaces the presociometric order; this procedure is all-embracing, it combines social change, diagnosis and measurement; (b) diagnostic sociometry—when the new sociometric order may or may not be put into operation as being impracticable in a particular social setting; it excludes social change for this reason but it includes measurement as a matter of course; and (c) mathematical sociometry—sociogram, sociomatrix, action matrix, and their generalized mathematics. The three divisions overlap and some workers have made contributions to each department.

Every science refers to a constellation of facts and the means of their measurement. Without adequate means of how to discover the facts and without some means of measurement a science does not exist. The preliminary step in the development of every science is to realize the conditions under which the significant facts emerge. How to accomplish this differs from science to science. How to realize the conditions under which physical and biological facts emerge, their description and careful observation and study, is comparatively well known. The problem of creating the conditions under which the significant facts of human relations emerge is far more complicated. It requires nothing short of revolutionary methods. The

reasons why there should be such a great difference between the preliminaries required for the social sciences as compared with the physical sciences is not immediately obvious. In the physical sciences, as the subject is inanimate, most of the emphasis has been placed upon the mechanical, physical aspects of the situation. We do not expect from the subjects, stone, water, fire, earth or planets, suns and stars, to contribute anything themselves to the study of their own selves; except in the mythologies, we do not ascribe any soul or personality to them, or at least we do not do it anymore. Therefore, the metaphysical relations which might exist between the planets and stars, to each other as mythological soul-bearing actors, does not concern the science of physics. This problem does not change much when it comes to cellular or animal organisms, f.i., in experiments with rats, guinea pigs, etc. The social investigator, the one who sets up the experiment and interprets the data is a human being and not a guinea pig or a rat. The rats or guinea pigs, so to speak, have no part in such experiments as actors in their own behalf. All such experimental designs are human designs and not designs of guinea pigs or rats. If a poetic mind à la Swift could describe how rats feel about each other and what the experiments which men make on them mean to them, it would probably be within our artistic but outside of our scientific comprehension. One could say here that we are trying to measure the behavior of rats as it "is" and not what rats feel it is, but this does not change the methodical difficulty which we encounter when we apply the same techniques of observation to the relationships of men among themselves. With animal societies one can take the stand that they are given and pre-ordained just like the individual animal organisms are, but human society is not automatically given and pre-ordained. Although deeply related to physical and biological conditions, it has a structure whose creation and development is initiated from within and must be studied from within.

Sociometric Generalizations

Sociometric research of small, microscopic social systems has led to a number of hypotheses which have been confirmed by a number of investigators independently.

(A) *The "tele" phenomenon.* Tele is the factor responsible for the degree of social gravity operating between individuals and groups of individuals. It is responsible for the degree of reality of the social configuration above chance. Tele (t) is increased in direct proportion to the number (n) of pair (p) relations and in inverse proportion to the number of unrecipro-

cated (u) relations. Transference (tr) increases in direct proportion to the number (n) of unreciprocated (u) relations and in inverse proportion to the number of pair relations (p).

(B) *The law of the "social atom".* The hypothesis states that as the individual projects his emotions into the groups around him and as the members of these groups in turn project their emotions toward him, a pattern of attractions and repulsions, as projected from both sides, can be discerned on the threshold between individual and group. This pattern is called his "social atom". "Every individual's social atom retains a significant *consistency* in its ratio of positive reciprocation and its interchoice ratio between two time points. The incidence of patterns at one time and at a later time in the same community is a relatively constant factor in the structure of attractions and in the structure of rejections which characterize it. There are found, in a given community, specific choice and rejection patterns and they show an orderly distribution within it. Yet, while the incidence of certain patterns may be relatively constant, the findings further show that the individuals occupying particular patterns at one time may or may not be the same individuals who occupy them at the later time."[6]

(C) *The "network" phenomenon.* More or less *permanent* structures which bind individuals into channelized formations, so-called "psychosocial networks" have been discovered. The forming of public opinion, the transmission of rumors, the "grapevines" cannot be understood by the investigation of individual attitudes only, even if the number of attitudes explored go into millions. The spark which binds individuals together changes the picture entirely because it moves the process from the individual-attitudinal-isolationistic level up to the sociometric level of correlations. Proofs that networks exist have been firmly established in 1932[7] through a study of rumors and an epidemic of runaways. The function of networks is architectonic, economic and regulative. They may well be compared with the circulatory system of blood transmission in human anatomy. In a community of 387 individuals, for instance, five networks were found in operation (each network consisting of 94, 85, 81, 67, 60 individuals). Notwithstanding that this discovery was made fifteen years ago (to my knowledge) all rumor and public opinion studies made since are stubbornly limiting themselves to the individual-attitudinal approach as if nothing had happened.

(D) *The "sociodynamic law".* The sociodynamic law is divided into

[6]Helen H. Jennings, "Leadership and Isolation", 1943.
[7]"Who Shall Survive?", pp. 256-265.

a first and a second part. The first part states that the income of emotional choices per capita is unevenly divided among the members of the group regardless of its size or kind; comparatively few get a lion's share of the total output of emotional choices, out of proportion with their needs and their ability to consummate them; the largest number get an average income of choice within their means to consummate them and a considerable number remain unchosen or neglected. The scores when plotted form a J curve, the great majority of the population receiving scores below chance and a relatively few obtaining scores much higher than chance. Though an equal number would have been expected on the basis of chance the proportion of isolates was generally greater than the proportion of stars.

The second part states that if the opportunities of being chosen are increased by increasing the size of the group and the number of choices per capita, the volume of choices continues to go to those at the top end of the range (the "stars") in proportion to the size of the group and to the number of choices permitted per capita, maintaining or increasing the gap between the small star group, the average group and the neglected group. The excess "profit" gained by the already overchosen members must be ascribed to a chain and network effect which operates in cases of non-acquaintance (with the chosen individual) in addition to the score based on acquaintance (with the chosen individual). The direct factor is proximity choice, the indirect factor, a symbolic choice. An individual, A, may score high in his face to face group, but because of his "role" (he may be a baseball player, an actor or a senator) his ultimate score may turn out to be a multiple of the initial score (role corresponds here to what is usually meant by status; status is too much of an abstraction, but role implies a living and concrete function).

The sociodynamic law affects all human relations, it operates, (a) on the interpersonal level and (b) on the intergroup level. It is found in some degree in all social aggregates whatever their kind, whether the criterion is search for mates, search for employment or in socio-cultural relations. Its effect may change in degree but it is universally present, appearing like a halo effect, *inherent in every* social structure. A particularly significant effect takes place on the level of economic relations. The "surplus" choice becomes analogous to the surplus value observed by Marx in the process of accumulation and production of capital. The distorted profit picture in economic relations is a reflection of the distorted tele picture on the interpersonal and intergroup level. The social revolution on the class level is therefore a displacement from the microscopic choice and rejection picture

to the macroscopic level. Social revolution on the macrosociological level is only *part* of the struggle. Marx was operating on the gross, macrosociological level of events. He often used intuitively near-sociometric ideas, a "macro" sociometrist. He was therefore rarely altogether wrong, but also rarely altogether right. Being unaware of the social microscopy of modern sociometry, he committed many grave errors[8] of insight. It would be interesting to envision what effect this knowledge would have had upon his theory and method of social revolution. It appears at least that the place of revolutionary action should have been reoriented towards the smallest units of human relations, the social atoms, the primary receptacles of "preferentiation", in order to become truly and permanently effective. The sociodynamic effect does not cease to be effective in a socialistic system of society.

(E) *The "sociogenetic law"*. The sociogenetic law states that the highest forms of group organization have evolved from simple ones: between the simplest patterns of groups formed by infants and the most complex formed by adults there are numerous intermediary stages. Parallel with this process of social differentiation a characteristic differentiation and growth of sociosexual structure takes place within the group. The course of differentiation may differ from one culture to another, from a pre-literate to a modern society, but a common basic core of evolutionary patterns and a parallel trend should be found in all of them.

(F) *The "law of social gravitation"*. People 1 (P1) and People 2 (P2) move towards each other—between a locality X and a locality Y—in direct proportion to the amount of attraction given (a1) or received (a2), in inverse proportion to the amount of repulsion given (r1) or received (r2), the physical distance (d) between the two localities being constant, the facilities of communication between X and Y being equal.

The formulas of Stouffer and Stewart, based on statistical analysis of number and distance, even if correct in themselves, are unsatisfactory because of their symbolic character, leaving the people out, the dynamics of interpersonal and intergroup relations. Stewart's finding can be easily integrated into the sociometric formula which then would read as follows:

People 1 (P1) and People 2 (P2) move towards each other in direct proportion to the amount of attraction given (a1) or received (a2), in inverse proportion to the amount of repulsion given (r1) or received (r2) and in inverse proportion to the physical distance (d) between locality X

[8] J. L. Moreno, "Marxism, Comptism and Sociometry," SOCIOMETRY, Vol. VIII, No. 2.

and locality Y, the residences of P1 and P2 respectively, the facilities of communication between X and Y being constant.

The attraction-rejection volume from a population, for instance of Beacon, to another population, for instance of Newburgh and vice versa, has two restraining factors to meet: (a) the volume of self-attraction (Beaconers for Beaconers, Newburghers for Newburghers) and (b) the volume of attraction-rejection between Beacon and Newburgh and other towns, for instance Poughkeepsie, Peekskill, Albany, New York, Chicago, Los Angeles, etc. Instead of talking here about attraction-rejection volumes we could talk in terms of the social gravitation quotients between two localities, their SGQs. By means of sociometric tests we can calculate the SGQs between two localities, the magnitude of the SGQs in reference to populations in other localities does not change the figure of the SGQs between A and B The total volume of social feeling and interest existing between individuals and groups throughout the human society is not determined by the number of individuals and the distance between them. Two sets of two groups (AB, CD) of the same size may vary many times in the social feelings they have for each other and the potential amounts of social feelings they could make available. When giving the sociometric test, for instance to the Beacon-Newburgh twin, we may arrive at the total volume of social feelings they have for people in various other localities of which their own relation is only a portion. The result can be expressed as follows: total volume of A-R (Attraction-Rejection) minus volume A-R towards other localities equals volume of A-R between Beacon and Newburgh. *The gravitation volume of physical distance is already inherent in these figures.*

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